GM Vine

How to design a participatory process for a research institute on a controversial issue?

Section A: General introduction

No. 2: Democratizing experiment? An abridged version of the article by Bonneuil, Joly and Marris.

Democratizing experiment?
The construction of GM-crop field trials as a social problem in France[1]

Christophe Bonneuil Pierre-Benoît Joly and Claire Marris

Between 1986 and 1996, thousands of field trials of genetically modified crops took place in France, the gateway to Europe for transgenic crops. It ranked second only to the United States in terms of the number of field tests carried out and these experiments triggered no protests, unlike in the USA and Germany in the 1980s. In 1996 a controversy about of genetically modified organisms (GMOs) erupted but for the first 3 years, the debate focused on the commercial use of GM crops and foods rather than on field tests. Yet by 2004 field trials had become a key issue in the public debate on GMOs – more so than in other countries, including the UK and Germany which had seen protests directed at field experiments in the previous decade. In 1998 there were 1,100 field experiments in France, but in 2004 GM crops occupied no more than 7.2 hectares on fewer than 50 test sites and over half of these were destroyed by protesters. However, it is not so much the number of fields destroyed (80) that indicated the importance of this issue (in the late 1990s, a greater number were destroyed in the UK), but rather the extent to which it crossed over a number of different intertwined arenas and influenced the trajectory of the wider GM debate. Protest activities took different forms in addition to field destructions (local bans, court cases, responses to government sponsored public debates and consultations) and thus the controversy had an impact in a number of different spheres, such as legal proceedings, regulatory procedures, scientific research agendas, participatory technology assessment, government policy… It triggered debates about the scope of the precautionary principle, the legitimacy of civil disobedience, and the function of public research. Through this controversy, it is not only the technical objects (GM crops), their risks and regulation that have been defined as a social problem but also experimental research and the function of public sector research institutes and thus the governance of research. Along with this shift from GM risks to the governance of research, protests against field trials have also contributed to shifting the French GM debate from a 'risk framing' to a 'socio-economic' framing (Heller, 2002).

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As Chaia Heller showed[2], the GMO controversy tilted around 1999 from a risk framing to a socio-economic framing. The question was not so much 'Are GMOs dangerous to consumers

[1] This is and abridged version. The whole text can be found in *Science, Technology and Human Values* in 2008.

or to the environment?' as 'Are GMOs instruments of agrochemical oligopolies' domination over small farmers?', 'Do they lead to the commodification of life?', 'What kind of agriculture and food do we want?'. The distribution of bread and Roquefort cheese by José Bové on a truck in Seattle and the destruction of GM field trials dedicated to studying the risks of GMOs correspond to a claim by farmers to relevant expertise, and a radical destabilization of expert framings of the GMO problem (…).

Disentrenching field testing of GM plants

Agricultural experimentation with new varieties obviously has a much longer history than that of GMOs. Since the mid-nineteenth century experimental farms, agricultural research stations and field tests were hybrid spaces between the chemistry laboratory and farming activity. These hybrid set-ups were essential for the theatre of agronomic evidence to function. Agricultural experimentation had both to imitate the conditions of usual agricultural practice if it was to avoid being branded as pure theory of no use to practitioners, and to import elements, objects and norms from the laboratory into the field if it was to provide the robust evidence that scientific peers expected (Henke 2000). In France, a national network of multi-site trials was set up by the National Institute for Agronomic Research (INRA) after WW2 and established a 'gold standard' for plant variety testing. Registration in the national seed catalogue requires field tests to assess homogeneity, distinction, and 'agronomic and technological value' of new varieties prior to commercialization. With its experimental norms and statistics, and market approval procedure, this national apparatus constituted an agricultural equivalent to drugs clinical trials in the biomedical domain (Bonneuil and Thomas 2005). For the following 50 years or so, putting new varieties to the test became an ordinary activity in the R&D and regulatory process. Tens of thousands of field trials were conducted annually, without attracting the attention of anyone but a small circle of researchers from seed companies, public research institutions, growers' technical institutes and the Ministry of Agriculture. The first field trials of genetically modified organisms, in 1986, took place in this context of 'entrenchment' (Dodier 2003), in relation to the public sphere, of experimental activities labeled as routine and specialized. We have identified four phases in the 'disentrenchment' of these experiments.

<u>First phase: boundary work (mid-1980s to mid-1990s)</u>

A public controversy emerged in the USA and in Germany during the 1980s when the first experiments of GMOs took place outside laboratories (Wrubel and Krimsky 1996). To avoid anti-GMO protest from crossing the Rhine or the Atlantic, French biotechnologists endeavored to keep public attention away from their tests, launched in 1986. An official from the firm Plant Genetic System wrote to Alain Deshayes, a senior scientist at INRA (the French public agricultural research agency):

[2] See Heller, C. (2002), From Scientific Risk to Paysan Savoir-Faire : Peasant Expertise in the French and Global Debate over GMO Crops, in *Science as Culture* 11 : 5-37

'…We fully agree that it is a very tricky area and that we have to proceed with extreme caution to avoid triggering a public debate. I also confirm that we will avoid advertising our tests this year' [3]

Plant biotechnologists in the public and private sectors wanted to take advantage of the 'difficulties of experimental releases in the US' (Deshayes 1986) to remedy what was perceived as France's techno-economic backwardness in agricultural biotechnologies compared to US. The government created a framework conducive to innovation by financing research projects and establishing flexible regulations for experimentation, based on OECD guidelines (OECD 1986). A new expert committee, the Commission du Génie Biomoléculaire (CGB) was set up under the authority of the agriculture ministry to evaluate the risks involved in the use of GMOs outside laboratories. This committee was dominated by molecular biologists promoting genetic engineering and the evaluation was optional for firms, which were not legally obliged to register their experiments.

With the harmonization of regulations of member States of the European Union (EU), GMOs were gradually put onto the agenda as a social problem. Two EC Directives were adopted in 1990, one on their 'contained use' (90/219) and the other (90/220) on what was then called the 'deliberate release into the environment' of GMOs. These directives turned GMOs into an object of regulation and thus labeled them in a specific way. The different actors concerned then had the possibility to stigmatize GMOs in various public arenas as requiring specific treatment such as specific and more in-depth risk assessments, labeling, boycotts, etc. – unlike in the USA where no GM specific regulation was ever adopted (Joly and Marris 2003).

Faced with opposition to any release into the environment by the Northern European countries and Germany, by the Greens in the European Parliament and by a coordination of NGOs (the 'Rainbow Campaign'), Directive 90/220 was a compromise. Although it was inspired by OECD guidelines (which stated that no specific new 'process-based' regulations were necessary for GMOs, arguing that they could be dealt with by existing 'product-based' regulations), it nevertheless provided for mandatory risk assessment before any release, significant containment precautions, and public information. In order to avoid the risk of opposition to experimental releases, the European Commission, prompted by the British, proposed a distinction between 'experimental' releases and 'commercial' ones. This was consistent with the OECD 'Blue Book', which recommended a 'step-by-step' regulatory procedure (OECD, 1986), and was enshrined as "Part B" and "Part C" of the Directive, which instituted a streamlined, national, assessment procedure for experimental releases and a more elaborate EU-wide procedure for market approval.

In April 1989 the chairman of the European Parliament's environmental commission, a German social democrat, had gone further and tabled an amendment proposing a five-year moratorium before any release (even experimental) could take place. This five-year period was to allow for research on the risks of GMOs, financed by the European Commission. This threat stimulated French biotechnologists from INRA and the seed industries, along with the molecular biologists who dominated the CGB, to act. Alain Deshayes and Axel Kahn (Chairman of CGB) wrote to the president of the European Parliament's environmental commission and organized a visit by four French Nobel Prize winners to lobby French

[3] Nat. Archives CAC 900318/20 Fonds Jacques Poly, M. Zabeau to A. Deshayes. Oct. 14th, 1986.

socialist European MPs in Brussels. In his letter to the chairman of the European Environmental Commission, A. Kahn noted:
'*banning experimental releases would be a mistake since it is necessary to continuously accumulate experimental data and references of great scientific value, essential for the formulation of bio-safety rules, based on an unquestionable scientific approach that guarantees objectivity, for future exploitation.*' [4]

With terms like 'experimental data and references', 'great scientific value', 'scientific approach' and 'objectivity', Kahn defined experimental releases in relation to their contribution to the production of scientific knowledge, rather than as an R&D activity. Shortly afterwards, in May, the French socialists distinguished themselves from the social democrat group in the European Parliament by voting against the environmental commission's amendments. The proposed moratorium was rejected by one vote.

Transposition of Directive 90/220 into French law increased the presence of the GMO issue in the political, regulatory, activist and media arenas in 1991 and 1992. The day the bill was voted in the National Assembly, Greenpeace carried out a spectacular action targeted at a GM maize experimental release. In this context and as allowed by Article 7 of the Directive, the rapporteur of the bill, MP Daniel Chevallier, tabled an amendment to require prior information of the public before authorization of a GMO field test. This proposal was strongly opposed by biotech Companies and members of the CGB and refused by the minister of research who considered that they were not to 'give in to the temptation of fastidious control, nor to the sirens of pseudo-democracy by involving in the debate on the potential dangers of genetic manipulation, representatives of associations that would not have the ability to grasp even the nature of that manipulation'[5].

In July 1992 the bill was passed without the amendment on prior consultation. After a peak in mid-1992, the presence of GMOs in the media arena dipped again until mid-1996. Thus, in the late 1980's and early 1990's, a framing of experimental releases as a category distinct from commercial crops was imposed in the regulatory arena . Cloaked in a cognitive function, considered harmless to society owing to rules of containment, these tests had to be protected from any lay intervention. They were framed as though they lay outside the debate on agricultural biotechnologies. We see here the pact of mutual non-intervention between scientific experimentation and society referred to by Krohn and Weyer (1994). But this situation was the product of the efforts of certain actors in the regulatory and political arenas to frame experimental releases as a laboratory activity and to construct a boundary between that experimental activity and the rest of society.

At that stage, French environmentalists were not unanimously opposed to genetic modification, nor unfavorable to GM field trials. In October 1988, on a visit to Rhône-Poulenc's research center, the environment minister and former leader of the French branch of Friends of the Earth was enthusiastic about the prospects of plant biotechnologies. The spokesperson for the Greens distanced his movement from the radical positions of Greenpeace and commented that 'there are all sorts of genetic manipulations, not all of which have the same effect and many of which are inoffensive' (quoted in Charles 1992, 62). France Nature Environnement (FNE), an important mainstream environment NGO, broke down the

[4] P. Legrand Archives. Axel Kahn to Schmid, March 23rd, 1989
[5] P. Legrand Archives. Memo from D. Holleau, Ministery of research , Oct 1991.

issue into three types of situation: experimentation in greenhouses was accepted, open field tests were allowed, subject to certain risk prevention measures and public information, while commercial crops were rejected due to potentially irreversible dangers (Ricou 1992, 4). Greenpeace was the only environmental organization that did not distinguish between experimental releases and other releases and opposed to both, considering that 'releasing these mutants into the environment carries incalculable risks' (quoted in Charles 1992, 62); but at this stage GMOs were not yet a priority for Greenpeace. Thus, the activist arena was not actively mobilized on the GMO issue or engaged in a fight against field tests. Where they were challenged, these experiments were framed more as a matter of the right to information rather than as an issue of risks that needed to be controlled by stronger evaluation and regulation.

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Second phase 1993-1996: Containment against knowledge?

The first serious challenge to the category of 'experimental release' created by the European Directive and transposed into the French 1992 law came not from activists, but rather from scientific experts and regulators, who questioned its appropriateness when the first requests for the commercialization of GM crops arrived. Jean Marrou, chairman of the Comité Technique Permanent de la Sélection (CTPS), the French advisory committee involved in the evaluation of new plant varieties prior to inscription in the European catalogue of plant varieties, noted that seed companies had conducted the R&D tests under the regulations of Part B of the Directive. This strategy aimed to guarantee regulators' acceptance of these trials, since they were subject to containment measures; but it also meant that when these firms applied for the authorization to commercialize their crops, they could provide little data on biosafety. Marrou proposed to "reduce isolation measures so that crops were grown in "normal" conditions. The objective was not to 'push through' an application but to evaluate the harmlessness of the variety"[6]. OECD experts also noted that "field containment has meant that it is not possible to draw conclusions in relation to environmental effects other than those on immediate release sites" (OECD 1993, 7).

Marrou wanted the CTPS field trials required for inscription in the catalogue to be run after the authorization for commercial production had been granted under Part C of the directive, whereas regulators at the Ministry of Agriculture, the chairman of the CGB and seed companies wanted to gain time by conducting them under the regulatory regime of Part B. After a period of friction in the arena of expertise between the norms and timeframes of two regulatory systems – the evaluation of new plant varieties and the evaluation of GM risks – the CGB and the seed companies prevailed. The Ministry of Agriculture invented a new 'B+' category for the CTPS trials[7].

The knowledge gap pointed out by Marrou and OECD experts put regulators in a difficult position as regards authorization of commercial production of GMOs for which the impacts – on a large scale and in the medium term – had not been amply documented. While the US government authorized the commercialization of a GM tomato (1994), followed in subsequent years by maize, soy and cotton, the French scientific, expert and regulatory arenas were the

[6] Fonds Jean Marrou. Recently handed over to Nat. Archives (not yet numbered)
[7] Fonds Jean Marrou. Recently handed over to Nat. Archives (not yet numbered).

scene of controversies on possible authorization of commercial production of GM oilseed rape and sugar beet. These two crops have wild relatives in Europe and several scientific articles published by then concluded that there was a risk of transfer of the herbicide resistant transgenes from crops to wild plants.

As a solution to the aporia in the separation between 'experimental' and 'commercial' releases, the notion of 'biovigilance' emerged: the argument was that the risks associated with large-scale commercial cultivation of GM crops could only be accurately evaluated when the crops were indeed grown on a large-scale. This concept should in theory have made it possible to launch into the commercialization of GM crops even when uncertainties about risks could not be resolved by experimental field tests (Roy 2001).

Although limited to some arenas – expert, regulatory, scientific – these controversies were an important step: first because they undermined the framing of experimental releases by Directive 90-220, by highlighting a contradiction between claims to containment and claims to the production of biosafety knowledge; and second because with the European Commission's authorization of commercial release of herbicide resistant GM oilseed rape varieties, some French scientists (especially population biologists) felt that their science had not been properly taken into account in the regulatory and expert arenas dominated by biotechnologists. In May 1996 these researchers signed a petition for a five-year moratorium on the commercialization of GMOs, and this linked them to actors in other public arenas (Bonneuil and Marris 2002).

Third phase 1996-1999: 'independent risk research' and the 'right to information'

In the autumn of 1996 and spring of 1997, with the researchers' petition for a moratorium, the repercussions of the mad cow crisis in the UK, Greenpeace actions in November to block US GM soya cargoes, Prime Minister Juppé's decision in February to ban GM maize crops and, Kahn's resignation as chairman of the CGB in reaction to that decision, the debate on GMOs took on the dimensions of a public controversy in several arenas (Joly et al. 2000). What was the role of experimental releases in that controversy? The authorization (or not) of the commercial cultivation of GM maize crops and a moratorium (or not) on the commercialization of any GM plant were the issues that polarized all the actors' strategies in the different arenas – culminating in a consensus conference in June 1998 and followed by the EU moratorium (led by France) a year later. In this context there was no opposition by NGOs to experimental releases. Since the aim was to stop the commercialization of GMOs, the NGOs highlighted the need for more in-depth research on the risks. The left-wing farmers' union Confédération Paysanne's position was the following: 'it is high time that we stopped authorizing just anything and that we gave priority to really independent, non-confidential research' (Hermelin 1996). Similarly, a key demand from the multi NGO campaign 'Beware of GMOs!' ('*Alerte aux OGM!*') was thus "the active development of research on risks". It is on this basis that some kind of alliance was formed between scientists involved in GM risk research and anti-GMO activists (Bonneuil and Marris 2002). While the scientists – some of whom had signed the 1996 petition – lent scientific legitimacy to calls for a moratorium, the NGOs called for more research on the risks of GMOs. They thus accepted, at least implicitly, the necessity of experimental releases for such research, and adhered to a framing of the problem that was dominated by the issue of environmental and health risks.

Although NGOs did not oppose experimental releases, they did begin to request a greater access to information about them. This issue had been highlighted since 1991 by FNE and from 1997 it became a key issue for several other NGOs too. FNE and FoE mobilized their networks of activists to raise the issue in the localities where field tests were carried out, and at the national level utilized the legal system to request that the location of field tests be made accessible to the public, on the basis that this was a 'public right'. After a few court trials, they finally won their case and since 2001 the Ministry of Agriculture has posted information about field tests on their website. Through this 'battle for transparency', these NGOs had mobilized an effective symbolic reference – 'the public right to information' – and developed a new mode of action that broadened the repertoire of anti-GMO activism.

Fourth phase 1999-2004: civil disobedience and participation

The first destruction of a test field in France was in 1997 but this means of protest only really took off in 1999. Because they targeted field trials conducted by public research institutions and research aimed at evaluating the risks of GM crops, the destructions challenged the implicit alliance formed in 1996 between environmentalist NGOs and researchers working on the risks of GMOs. The destruction of Anne-Marie Chèvre's experiment on the risks of gene transfers between GM rapeseed and related wild species on 2 June 1999 marked a turning point for these researchers. This action traumatized Chèvre and prompted her to launch an 'open letter to citizens' which was published in a national daily[8] and signed by 337 researchers. Chèvre, an INRA researcher who had been a sympathizer of the CP, and whose research on gene flows had been used by NGOs, felt challenged on what she believed to be her public service function:
If no scientific information was wanted […] it should have been made clear earlier, rather than using our data as arguments! […] Was I naïve to believe that, in the debate, research could provide answers to the questions asked? [9]

Other destructions of public and private sector field trials followed and NGO activists utilized the dozens of ensuing court cases to shift the framing of the GMO debate: GMOs were no longer simply questionable as risky technical artifacts but also dubious choices in the orientation of public research. These court cases afforded an opportunity for activists to criticize public sector research institutions' policy, to highlight scientific uncertainties, and to attempt to frame field destructions as an enactment of the precautionary principle and as civil disobedience in the long tradition of actions whereby a conscious minority helped the law to progress, as in Gandhi's fight or the right to abortion movement. Indeed a striking feature of the destruction of field tests in France is that they are usually practiced openly in the form of a festive street demonstration, rather than as 'ecoterrorism' practiced at night under the cloak of anonymity; and they have been theorized by their promoters as an act of civil disobedience in the tradition of the 1773 Boston Tea Party that paved the way for America's emancipation from British colonial domination (Bové and Luneau 2004).

Some activists sought to shift the framing of the debate even further: field destructions became part of a strategy devised by leaders of the Confédération Paysanne (CP), together with a few other NGOs including Attac, an anti-globalization (or 'alter-globalization', as it

[8] Libération, 23 June 1999.
[9] A.-M. Chèvre, e-mail to the transgenesis forum of 18/04/00.

prefers to be called) NGO founded in 1997 (30,000 members in 1999) designed to shift the framing of the GMO debate from a 'risk framing' that implied a predominance of scientific experts' discourse, to a socio-economic (or 'alterglobalist') framing of the GMO issue (Heller, 1992). In this new framing, the question of the appropriateness of GMOs overtook that of their potential risks. Farmers' opinions were considered more legitimate than those of scientists since they were based on their practical and militant expertise concerning what was 'good food' and what the consequences of oligopolies and the 'commodification of seeds' would be on the world's peasantry. In a letter to INRA researchers, after noting that a field of destroyed GM oilseed rape was only 500 meters from a non-GM seed production field, and the consequent risks of 'genetic contamination', a CP leader continued:
But we could carry on debating purely scientific questions of which you, researchers, are the only ones to really have the keys […] What is important to us […] is the underlying justification for these experiments. […] [GMOs are] a fundamental tool in the dependence of all the world's farmers and therefore all its people whose fate will be merrily sealed at the forthcoming Seattle conference […] We would therefore like scientists, like all citizens […] to categorically say NO to GMOs and their future implications for the world.[10]

With the destruction of one field trial in six in 2001, one in three in 2003 and more that one in two in 2004, this activity became a risky bet for seed companies and public research institutions (**Fig. 3**). This was fuelled by extensive media coverage of several affairs of contamination of non-GM seeds and fields by GM seeds, such as the contamination of maize seeds announced by AFSSA in July 2001.

With the focus on field tests, local actors emerged in the political arena. From 2001 onwards, about 2,000 town councils and 16 out of 26 regional governments voted local GM bans. These local scenes articulate the activist arena (localizing trial sites, pressing elected representatives to take a stand, mobilizing citizens to participate in field destructions), the political arena (deliberations and votes for/against bans), the legal arena (court cases following the systematic challenge of local bans by the central government, as well as trials of activists involved in field destructions) and the local media. Field trials were defined here as a problem of democracy: arguments centered not only on the need for more citizen information and participation, but also on the decentralization of power to local representatives who were best placed to know about local agricultural conditions. This bottom-up mobilization of local representatives also prompted the parliament (Le Déaut and Ménard 2005) and national political parties to take a stand on experimental releases. In 2004, shortly after a regional government announced bans on GM crops, the national leadership of the socialist party (social democrats) "firmly condemned the continuation of open air field tests" – a turnaround in this party's position on the subject[11]. Just before that the Greens and the communist party, some of whose representatives took part in field destructions in 2003-2004, sought favor with José Bové and suggested he lead their list for the 2004 European elections. Key actors in the political arena were also spurred to frame GM field tests as a social problem. For instance, after the 2001 destructions, the minister for agriculture opened up the black box of GM field tests as a knowledge-producing activity, considering that one should make a distinction between firms' commercially oriented R&D experiments and public risk research experiments.

[10] November 9th, 1999. Letter from the Confédération Paysanne Ariège (Didier Leboeuf) 'to the scientists'. Kindly communicated by A.-M. Chèvre.
[11] AgriSalon, May 12th, 2004.

Recent years have also seen the emergence of an arena of participatory debates around the issue of experimental release as a response to contestation. Given the intensity of field trial destruction in August 2001, the government decided to launch a public debate. The '*Débat des quatre sages*' (Four Wise Men's debate) took place in February 2002 and resulted in a report written by the four organizers, chairpersons of four national consultative commissions dealing with food policy, technology assessment, bioethics and sustainable development (Babusiaux et al. 2002). The report reframed experimental releases as 'an irruption in the social space'**:** 'the field cannot be considered as a mere extension of the laboratory. The natural or agricultural space is always a public space, hence a social space. The term "field trial" suggests a situation in-between laboratory experiment and social space whereas, through the dissemination it causes, this trial is fully situated in the social space' (p. 16)